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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,377	12/23/2004	George Cullen	KNN-017	4662

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EXAMINER	
TSAI, CAROL S W	

ART UNIT	PAPER NUMBER
2857	

MAIL DATE	DELIVERY MODE
03/17/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/501,377	CULLEN ET AL.	
	Examiner	Art Unit	
	CAROL S. TSAI	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10-13 and 15-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *10-13* is/are allowed.

6)☒ Claim(s) *1-7,15-27 and 29-40* is/are rejected.

7)☒ Claim(s) *8 and 28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 September 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4, 7, 15, 16, 18-20, 22, 23, 27, 29, 30, 32-37, 39, and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by U. S. Patent No. 6,138,078 to Canada et al.

With respect to claims 1, 15, 18, 29, 30, 36, and 37, Canada et al. discloses an electric motor (ac inductor motor 102 shown on Fig. 9) monitoring system (monitor 101 shown on Fig. 9) comprising an antenna (radio frequency data link 465a-b shown on Fig. 9) and a processor (microcomputer 170 shown on Fig. 5); the antenna (antennas 465a and 465b shown on Fig. 9) detecting a radio-frequency signal generated by arcing events in the electric motor (see col. 13, lines 36-44, ***sensors 460a-d for sensing operating parameters of both the motor 102 and the driven equipment 450 … Alternatively, the external sensors 460a-d are tethered by wireless means such as radio frequency (RF) data link 465a-b***; and col. 14, lines 22-33, ***many electric motors are now manufactured with a resistance temperature detector (RTD) wound in with the stator wires. The RTD lead, which is typically accessible by means of a connection port 558 at***

the motor junction box 550 (FIG. 10), may be tethered to the monitor 100 by connection of the monitor 100 to port 558, as further described below. Data provided by the RTD is used by the monitor 100 to provide a temperature history of the motor windings. The temperature history can then be analyzed to detect and monitor anomalous motor operating conditions resulting from overheating of the windings (such as winding insulation degradation)); and the processor processing the radio-frequency signals generated by the arcing events in the electric motor to determine one or more operational parameters of the electric motor (see Fig. 9 and col. 13, lines 36-44; ***sensors 460a-d for sensing operating parameters of both the motor 102 and the driven equipment 450. The tethered sensors 460a-d, which may include sensors for sensing machine operating parameters such as vibration (radial, horizontal, vertical, and other variations), temperature, flux, and the like, are preferably tethered to the monitor 100 by cables***).

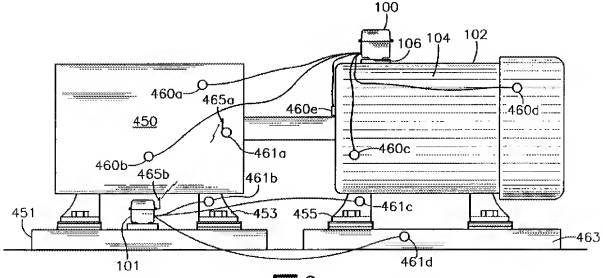

Fig. 9

As to claim 2, Canada et al. also disclose a means for screening background noise so

improving the overall signal to noise ratio of the electric motor monitoring system (see col. 11, lines 25-30).

As to claims 3 and 4, Canada et al. also disclose a frequency matching unit such that the frequency matching unit allows the antenna to be frequency tuned so as to optimize its operation with the electric motor (see col. 6, line 60 to col. 7, line 3).

As to claim 7, Canada et al. also disclose an electric field probe or a magnetic field probe (a magnetic flux sensor 124 shown on Fig. 5).

As to claim 16, Canada et al. also disclose associating the frequency of the radio frequency signal to individual components of the electric motor (see Fig. 9).

As to claims 19 and 34, Canada et al. also disclose Fast Fourier Transformations so as to convert the sampled data to interpretable frequency spectra (see col. 7, lines 15-18 and col. 12, lines 6-13).

As to claim 20 and 22, Canada et al. also disclose the application of Digital Signal Processing techniques to the sampled data so as to convert the sampled data to interpretable frequency spectra (see col. 12, lines14-31).

As to claims 23, 32, and 39, Canada et al. also disclose frequency features that can be directly associated with particular mechanical or electrical faults of the electric motor (see col. 7, lines 30-53).

As to claim 27, Canada et al. also disclose the additional step of self-calibration of the method (see col. 7, lines 26-29).

As to claims 33 and 40, Canada et al. disclose determining variations in the operational parameters of the electric motor (see col. 13, lines 30-44).

As to claim 35, Canada et al. also disclose manipulating and storing data corresponding to the radio-frequency signals (see col. 2, lines 57-63 and col. 9, lines 41-49).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Canada et al. in view of DE003140319A1 to Lindsay et al.

As noted above, Canada et al. disclose the claimed invention, except for a balanced Faraday screened loop antenna/an unbalanced Faraday screened loop antenna.

Lindsay et al. teaches a balanced Faraday screened loop antenna/an unbalanced Faraday screened loop antenna (see Abstract, lines 1-17).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Canada et al.'s system to include a balanced Faraday screened loop antenna/an unbalanced Faraday screened loop antenna, as taught by Lindsay et al., in order that when the alternating magnetic field amplitude is constant, the output signal of the antenna is free of resonances over a wide range, virtually independently of the frequency.

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Canada et al. in view of U. S. Patent No. 5,737,026 to Lu et al.

As noted above, Canada et al. disclose the claimed invention, except for the detection of the high frequency signals employing a non-intrusive antenna.

Lu et al. teach the detection of the radio frequency signals employing a non-intrusive antenna (see col. 12, lines 4-22).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Canada et al.'s method to include the detection of the radio frequency signals employing a non-intrusive antenna, as taught by Lu et al., in order to pick up the video signal radiated by the rear end of a television set's picture tube.

7. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Canada et al. in view of U. S. Patent No. 6,701,274 to Eryurek et al.

As noted above, Canada et al. disclose the claimed invention, except for Wavele Analysis.

Eryurek et al. teach Wavelet Analysis (see col. 3, line 50 to col. 4, line 19).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Canada et al.'s method to include Wavelet Analysis, as taught by Eryurek et al., in order to allow the frequency components to be identified.

8. Claims 24-26, 31, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Canada et al. in view of U. S. Patent No. 5,434,509 to Blades.

As noted above, with respect to claims 24-26, Canada et al. disclose the claimed invention, except for calculating an average width of the radio frequency signals, above a predetermined level, over a number of arcing events.

Blades teaches calculating an average width of the radio frequency signals, above a predetermined level, over a number of arcing events (see col. 21, lines 18-42).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Canada et al.'s method to include calculating an average width of the radio frequency signals, above a predetermined level, over a number of arcing events, as taught by Blades, in order that high-frequency noise characteristic of arcing on the power line and distinguishable from other sources of high-frequency noise can be determined.

As to claims 31 and 38, Canada et al. do not disclose determining a physical location within the electric motor according to the arcing events.

Blades teaches determining a physical location within the electric motor according to the arcing events (see col. 2, lines 53-61).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Canada et al.'s method to include determining a physical location within the electric motor according to the arcing events, as taught by Blades, in order that the arcing of the motor can be located.

Allowable Subject Matter

9. Claims 8 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Claims 10-13 are allowed.

11. The following is a statement of reasons for the indication of allowable subject matter:

12. U. S. Patent No. 5,434,509 to Blades in view of U. S. Patent No. 4,999,641 to Cordery et al. are references closest to the claimed invention. Blades in combination with Cordery et al. disclose an antenna for measuring high frequency radio frequency signals associated with arcing events from a brush contact in an electric motor, the antenna comprising a loop and a loop screen, and the loop screen shields the loop from background noise thus improving the signal to noise ratio of the signal detected by the antenna. However, Blades in combination with Cordery et al. do not teach the loop comprising a conductor and a screened coaxial cable such that the conductor is turned back on itself so as to form one or more turns while the end of the conductor cable is attached to the screen of the coaxial cable; and including all of the other limitations in the respective independent claims.

Response to Arguments

13. Applicant's arguments filed December 19, 2007 have been fully considered but they are not persuasive.

14. Applicants argue that Canada et al. et al. disclose magnetic flux instead of the antenna detecting radio frequency signal generated by arcing events in the electric motor. The Examiner

disagrees with Applicants. As set forth in the art rejection above, Canada et al. do teach antenna detecting a radio-frequency signal generated by arcing events in the electric motor (see col. 13, lines 36-44, *sensors 460a-d for sensing operating parameters of both the motor 102 and the driven equipment 450. The tethered sensors 460a-d, which may include sensors for sensing* ***machine operating parameters such as*** *vibration (radial, horizontal, vertical, and other variations), temperature,* ***flux****, and the like, are preferably tethered to the monitor 100 by cables.* ***Alternatively, the external sensors 460a-d are tethered by wireless means such as radio frequency (RF) data link 465a-b***; and col. 14, lines 22-33, ***many electric motors are now manufactured with a resistance temperature detector (RTD) wound in with the stator wires. The RTD lead, which is typically accessible by means of a connection port 558 at the motor junction box 550 (FIG. 10), may be tethered to the monitor 100 by connection of the monitor 100 to port 558, as further described below. Data provided by the RTD is used by the monitor 100 to provide a temperature history of the motor windings. The temperature history can then be analyzed to detect and monitor anomalous motor operating conditions resulting from overheating of the windings (such as winding insulation degradation))***(NOTE**:** Canada et al. clearly indicate arcing events : The temperature history can then be analyzed to detect and monitor anomalous motor operating conditions resulting from overheating of the windings (such as winding insulation degradation). In addition, magnetic flux is one of machine operating parameters sensed by sensor 460a-d for detecting arcing events in order those events can be identified and transmitted by antenna radio-frequency signal. Therefore, Canada et al. do not disclose magnetic flux for communication purposes.

15. Applicants argue that Lindsay et al. disclose magnetic flux instead of the antenna to measure radio frequency signal. As set forth in the art rejection above, Canada et al. disclose the claimed invention, except for a balanced Faraday screened loop antenna/an unbalanced Faraday screened loop antenna. Lindsay et al. teaches a balanced Faraday screened loop antenna/an unbalanced Faraday screened loop antenna (see Abstract, lines 1-17), in order that when the alternating magnetic field amplitude is constant, the output signal of the antenna is free of resonances over a wide range, virtually independently of the frequency. Therefore, Canada et al. in combination with Lindsay et al. do teach the claimed invention.

16. Applicants argue that Lu et al. disclose magnetic flux instead of the antenna to measure radio frequency signal. As set forth in the art rejection above, Canada et al. disclose the claimed invention, except for the detection of the high frequency signals employing a non-intrusive antenna. u et al. teach the detection of the radio frequency signals employing a non-intrusive antenna (see col. 12, lines 4-22), in order to pick up the video signal radiated by the rear end of a television set's picture tube. Therefore, Canada et al. in combination with Lu et al. do teach the claimed invention.

17. Applicants argue that Eryurek et al. disclose magnetic flux instead of the antenna to measure radio frequency signal. As set forth in the art rejection above, Canada et al. disclose the claimed invention, except for Wavele Analysis. Eryurek et al. teach Wavelet Analysis (see col. 3, line 50 to col. 4, line 19), in order to allow the frequency components to be identified. Therefore, Canada et al. in combination with Eryurek et al. do teach the claimed invention.

18. Applicants argue that Blades discloses magnetic flux instead of the antenna to measure radio frequency signal. As set forth in the art rejection above, Canada et al. disclose the claimed

invention, except for calculating an average width of the radio frequency signals, above a predetermined level, over a number of arcing events. Blades teaches calculating an average width of the radio frequency signals, above a predetermined level, over a number of arcing events (see col. 21, lines 18-42), in order that high-frequency noise characteristic of arcing on the power line and distinguishable from other sources of high-frequency noise can be determined. Therefore, Canada et al. in combination with Blades do teach the claimed invention.

19. Applicants argue that Blades discloses magnetic flux instead of the antenna to measure radio frequency signal. As set forth in the art rejection above, Canada et al. do not disclose determining a physical location within the electric motor according to the arcing events. Blades teaches determining a physical location within the electric motor according to the arcing events (see col. 2, lines 53-61), in order that the arcing of the motor can be located. Therefore, Canada et al. in combination with Blades do teach the claimed invention.

Conclusion

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAROL S. TSAI whose telephone number is (571)272-2224. The examiner can normally be reached on M-F(8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eliseo Ramos-Feliciano can be reached on 571-272-7925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

March 3, 2007
Art Unit 2857

/Carol S Tsai/
Primary Examiner, Art Unit 2857